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ABSTRACT

The management problems of the implementation process of an Individualized Audio-Tutorial (IAT) learning unit in ninth grade biology in Israel are discussed. The sequence of the learning activities in relation to four problems which were raised during the implementation process are presented: (1) administrative problems at the school level; (2) administrative problems in the laboratory, classroom, or technical level; (3) classroom management problems; and (4) teacher-student behavior. These problems are identified as important because they have an impact on the reciprocal process of the implementation phase on one hand, and the formative evaluation of the learning units on the other. Four charts are included which provide: the scheme of a sequence of learning activities in an IAT lesson; sample card used by students to record their learning unit activities; the learning process of an IAT in a typical classroom; and a comparison of teachers' and students' behavior in conventional courses and IAT courses. A list of references completes the document. (Author/JB)

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CLASSROOM MANAGEMENT PROBLEMS IN THE IMPLEMENTATION PROCESS OF AN AUDIO-TUTORIAL PROGRAM IN BIOLOGY

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Classroom Management Problems in the Implementation Process of an Audio-Tutorial Program in Biology

Abstract

The management problems of the implementation process of an individualized audio-tutorial learning unit in Biology in the 9th grade junior high school are discussed. The sequence of the learning activities in relation to four problems which have been raised during the implementation process are presented: a) administrative problems at the school level; b) administrative problems in the laboratory, classroom, or technical level; c) classroom management problems; and d) teacher-student behavior. All these problems are important since they have an impact on the reciprocal process of the implementation phase on one hand and the formative evaluation of the learning units on the other, which is one of the possible facets of a curriculum in the making.

The individualized audio-tutorial (IAT) method developed by Postlethwait et al. (1972) is a mode of instruction in which students pursue the learning process individually at their own pace. The learning activities require the student to read parts of tests, teacher written learning material, workbooklets and journal articles. The workbooklets take the place of student-teacher verbal interactions, and students perform experiments, view slides, and listen and follow directions from tape recorders; their role is to coordinate among the different learning activities. The IAT was implemented mostly at the college level and much less at the high school level.

It can be assumed that the major reasons for this may be attributed to the significant difference which exist between the two systems, colleges on one hand and high schools on the other, in their structures. Several conditions are making the implementation of the IAT at the college level much easier. Just to mention a few of them: a college student's timetable is much more flexible and can be spread over the hours of the days, months, and years; students are not restricted each year to specific subject matters and they do not have to pass from one grade to another according to their age. In general, ctudents can take a course, commencing and finalizing it during any part of the year. In other words, at the college level the characteristics of the IAT can be observed, while in the high schools, due to several restrictions, the implementation process is made much more difficult. To remind of some of the restrictions which exist at the secondary level, the following can be mentioned: (a) rigid timetable (the same subject matter at the same time, for a certain age, which in many situations becomes a condition for passing from one grade to another, according to a student's age) -- specific subject matter is offered during

part of the year and not during the entire academic year; (b) lack of free access to labs and integration of the learning process as a continuity between laboratory experiments and classrooms with the possibility of a free movement between the laboratory, classroom, and the school library; (c) lack of good lab technicians, availability of learning material, lab materials, and equipment, as well as audio-visual aids.

Geisert (1977) mentioned some of the problems regarding the implementation process of audio-visual programs at the college level, which raise questions about their individualized nature, and are common for the high school level, too.

Another important point is teachers' behavior. Teachers are asked to change their mode of teaching from teacher-center oriented to a situation in which the student is the center, is active and responsible for his/her learning. The teachers have to create a classroom climate in which students will learn. As a result, teacher-student relations change from a give and take situation to a situation in which the teacher, who prepared or developed the learning material, can now be a guide with whom the students can discuss, consult, etc.

Thus one can see that the curriculum in making involves various interactions and processes. It is a system of interrelationships which could be compared to an ecology system in a bioniche. The curriculum influences teachers' and students' behavior and their behavior influences the curriculum. Other factors which are also involved in this process of curriculum in making are the administration system of the school, laboratory assistants, the fellow teachers, and classroom management problems.

In studies related to the implementation of the IAT method it was found that the audio-tape component, while it did not have an impact on achieve-

ment of average and high achievers, it did affect positively achievement of low ability students (Novak, Ring, and Tamir, 1971) and of below average students (Holliday, 1974; Brice, 1974). Similar results were reported by Nordland et al. (1975) regarding children below the 40th percentile on standardized measures of ability, who achieved higher with an audio-tutorial instruction method, and by Kahle, et al. (1976) who found that this method is as effective for disadvantaged students as the traditional instruction.

Higher achievement for junior high school students and their positive attitudes toward the method while instructed with the IAT approach were reported by Lazarowitz and Huppert (1981, 1982a, 1982b).

Reviewing studies related to the use of the IAT method in schools, Kahle (1978) concluded that the IAT instructional mode can "provide truly individualized multi-dimensional modules appropriate for learners with different cognitive styles, different intellectual levels, different ethnic backgrounds, different verbal abilities, or different attitudes."

In this paper we shall focus on the interrelationships involved in the implementation process of an IAT learning unit in Biology, "The Cell" for 9th grade junior high school students in Israel. The "cell" units included an introduction and three learning booklets; Cell membrane, cell nucleus, and cell organelles.

The three booklets, the biology content sequence, a typical learning period, and their evaluation were presented elsewhere (Lazarowitz and Huppert, 1981, 1982a, 1982b).

First we shall describe the sequence of the learning activities which constitute an IAT learning unit and then we shall relate to four problems which have been raised during the implementation process of the IAT learning units.

The sequence of activities in an IAT learning unit

The "Cell" learning unit is based on an integrated sequence of various learning activities such as readings, laboratory experiments, slides, film loops, self-assessment questions, etc., and a tape recorded commentary which connects the various activities. These activities are presented in Figure 1 and display the sequence of the cell nucleus learning unit, as an example.

Insert Figure 1 about here

While the sequence of the activities presented in Figure 1 represents our experience in teaching the "cell" learning units, this sequence can be applied to any learning material based on an individual audio-tutorial approach.

Therefore as one can see from Figure 1, the course structure allows students to proceed at their own pace and to break the subject matter studied into small units of activities according to their ability. The use of multi-media provides students with the opportunity to cover the subject in various ways.

The nature of this sequence minimized the competition among students and the failures were private. The opportunity to study again different parts of the learning unit according to the individual needs of the students did not interfere with the progress of the whole class.

Problems in the implementation process of the IAt learning units

1. Administrative problems at the school level.
2. Administrative problems in the laboratory, classroom, or technical level.
3. Classroom management problems.

4. Teacher-student behavior.

All these problems are important since they have an impact on the reciprocal process of the implementation phase on one hand and the formative evaluation of the learning units on the other, which is one of the possible facets of a curriculum in the making.

1. Administrative Problems at the School Level

a. Classroom and Laboratory Use.

Due to the integrated use of various learning strategies such as performing experiments, watching slides and films, and listening to recorded commentaries with audio-visual aids, building (constructing) models, as well as reading, writing, or the necessity to hold group or classroom discussions, there is no real distinction between classroom and laboratory activities. All the lessons therefore have to be held in a laboratory-classroom situation where the appropriate equipment is available. In practice in our schools, such conditions are not always available and the performance of an IAT course has to be adjusted to suit local conditions.

b. School timetable

Another requirement of an IAT method is the necessity of a double period in order to enable the performance of various learning activities of a unit. This requirement, as well as the one mentioned above, ask for changes in the school timetable related to the availability of classrooms and laboratories, as well as changes in the schedule of each teacher.

2. Administrative problems in the laboratory, classroom, or technical level

a. The asynchronic performance of the various laboratory experiments required a different kind of preparation of materials and laboratory hardware. Due to the self-pace nature of the program, instead of preparing many sets of identical experiments, various sets of different experiments were needed at the same time. Extension laboratory activities required additional equipment and materials had to be available to students on request. Laboratory assistants had to be well acquainted with the program, its structural learning activities sequences in order to be able to cope with students' needs, teachers' requests, and the aims of the program.

b. Suddenly it was found that there is a need of recording students' progress which can inform laboratory assistants and teachers about which equipment is to be prepared for experiments for the next lesson and in which quantity. As a result, a "student recording card" was developed and used. (See Figure 2.) Due to

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Insert Figure 2 about here

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the self pace approach, the "student recording card" included activities and extension units' numbers for all three learning units. Each student was requested, at the end of each double period, to mark on the card the appropriate number (see Figure 2) which represented a specific activity in the sequence of each of the learning units studies. A (-) sign meant "in progress", while a (+) meant the activity was completed. Based on this student recording card, teachers and laboratory assistants were able to

receive an accurate daily picture of the progress of each student. Thus they were able to monitor each student's rate and at the same time to know what was to be prepared for the following lesson.

c. The use of various A-V aids such as slide projectors, film-loop projectors, tape recorders, etc. required the constant service of a technician who is not always available at the JHS. Not all of our JHS teachers have the skill and the courage to deal with the various A-V equipment. Students were sometimes more successful in solving various technical problems and we suggest the use of their skills more often. Therefore the IAT approach of learning requires a high level of interaction between the laboratory assistants and the teacher, regarding the preparation and the performance of the different experiments and other learning activities. This need for interaction leads to a high level of cooperation between the laboratory assistants and the teachers. The laboratory assistants, for instance, took part in the various inservice training organized by schools which implemented the IAT method.

3. Classroom management problems

The self-paced nature of the IAt method required a different way of organizing classroom activities.

a. Due to the self-paced progress, the fast learners completed their learning unit in a shorter period of time than the other students. The slower learners needed more time to complete the same unit. Therefore gaps between the learning progress of the various students soon evolved. Because of this, there was a need for

additional learning assignments which were supplied to those students who finished the basic learning material. These additional assignments were called extension units which included more material about the "cell". These extension assignments offered students an opportunity to broaden their knowledge of the various topics studied in the learning unit. They were prepared at different levels of difficulty, in a diversified manner.

Thus, these two factors integrated in the IAT method, i.e. individual pace of learning combined with diversified extension assignments made the IAT curriculum suitable for a heterogeneous class.

In Figure 3, one can see the learning process of a typical IAT classroom, where the self pace of students raised the necessity of extension units. The management of such a classroom situation is not an easy one.

Insert Figure 3 about here

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b. As students progressed at their own pace, different students studied on different assignments at the same time. The teacher had to monitor these activities and also be ready to supply additional extension activities when these were needed. Sometimes, because of a shortage of equipment such as slide projectors, tape recorders and others, the teacher had to be able to suggest a change in the learning activity sequence. The teacher had the opportunity to consult and to help the students individu-

ally. But sometimes he/she had problems with how to react when his/ her help was needed by a student when he/she was busy with another student.

In an IAT method the teacher is less busy in developing his/her own teaching material. The teacher's main task is to establish a motivating classroom climate; a good management system is a condition for reaching such a goal.

One of the outcomes of a Questionnaire-Opinionnaire which was given to 80 students and 35 teachers indicated the clear necessity of establishing a management system which can guide the teachers, laboratory assistants and students when performing an IAT course.

The preservice and inservice programs in Israel very seldom include courses which deal with classroom management problems in an individualized multi-media curriculum. As a response to this, a permanent Teacher's Workshop has been established. At this Workshop, various short courses were organized in order to tutor teachers who are implementing the IAT course, especially in the area of classroom management. The courses deal with certain organization skills and devices such as organizing independent learning, organizing A-V equipment in the classroom and developing an efficient monitoring system.

This Teachers' Workshop also acts in developing a "Management Guide" for the IAT course "The Cell" and prepares examples for the various extension activities. The Teachers' Workshop is also a center for consultation and supplies, and learning materials such as slides, film-loops, games, etc.

4. Teacher-Student Behavior

The implementation of the IAT course required changes in teachers' and students' behavior and also in their relationships both at the affective as well as at the cognitive levels. In Figure 4, some of these behaviors were exposed, in contrast to those exposed in a conventional course.

Insert Figure 4 about here

These changes may have an immediate impact on the classroom learning environment and may influence the structure of the curriculum as well. In a student-centered curriculum such as the IAT unit the teacher acts less as the only provider of knowledge and becomes more a guide, facilitator or a consultant. The teacher isn't approaching the class as a whole but is dealing with each student individually. The structured curriculum allows the teacher to help the individual student and therefore his relationship with his students becomes more direct, more personal. This behavior helps many students to develop their self-confidence on one hand, but on the other hand causes some students to become very teacher-dependent.

The IAT method can encourage the acquisition of independent learning habits by the students. It also enhances the active role of the students in the learning situation. In practice, we have noticed that not all of our ninth grade students were able to change their passive behavior to an active, self-learning behavior during the implementation of the IAT course. There is no doubt of the need for preparing teachers for a new method of teaching. The same can be said for the needs of the students. Our observations show that ways have to

be found for preparing the students to act properly in an individualized, multi-media learning process according to the skills needed. We have to teach the student how to organize his learning schedule, based on his own rate of progress, how to read meaningfully and understand properly written instructions and how to self-assess his mastery of the learning material. The acquisition of these skills has to be a part of an IAT method in order to assure its successful implementation, since it requires students to exercise a high self-responsibility in their learning.

Summary

The implementation process of the IAT curriculum, "The Cell", has shown an interesting system of interrelationships and reciprocal influences among teachers, students, and curriculum.

Because of the web-like nature of this system we can compare these relationships to an ecology system, where the different factors influence each other and cause various changes in order to reach the best functional conditions. As we saw these relationships included organization, timetable, classroom-laboratory settings, teacher-lab technician-student relations, student learning materials and audio-visual aids, and new student-teacher interactions, to mention a few of them.

By learning more about the various factors influencing the implementation process of a new method we can do more in order to improve the curriculum and the instruction of science in schools.

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FIGURE 1

A SCHEME OF A SEQUENCE OF LEARNING ACTIVITIES IN AN IAT LEARNING UNIT

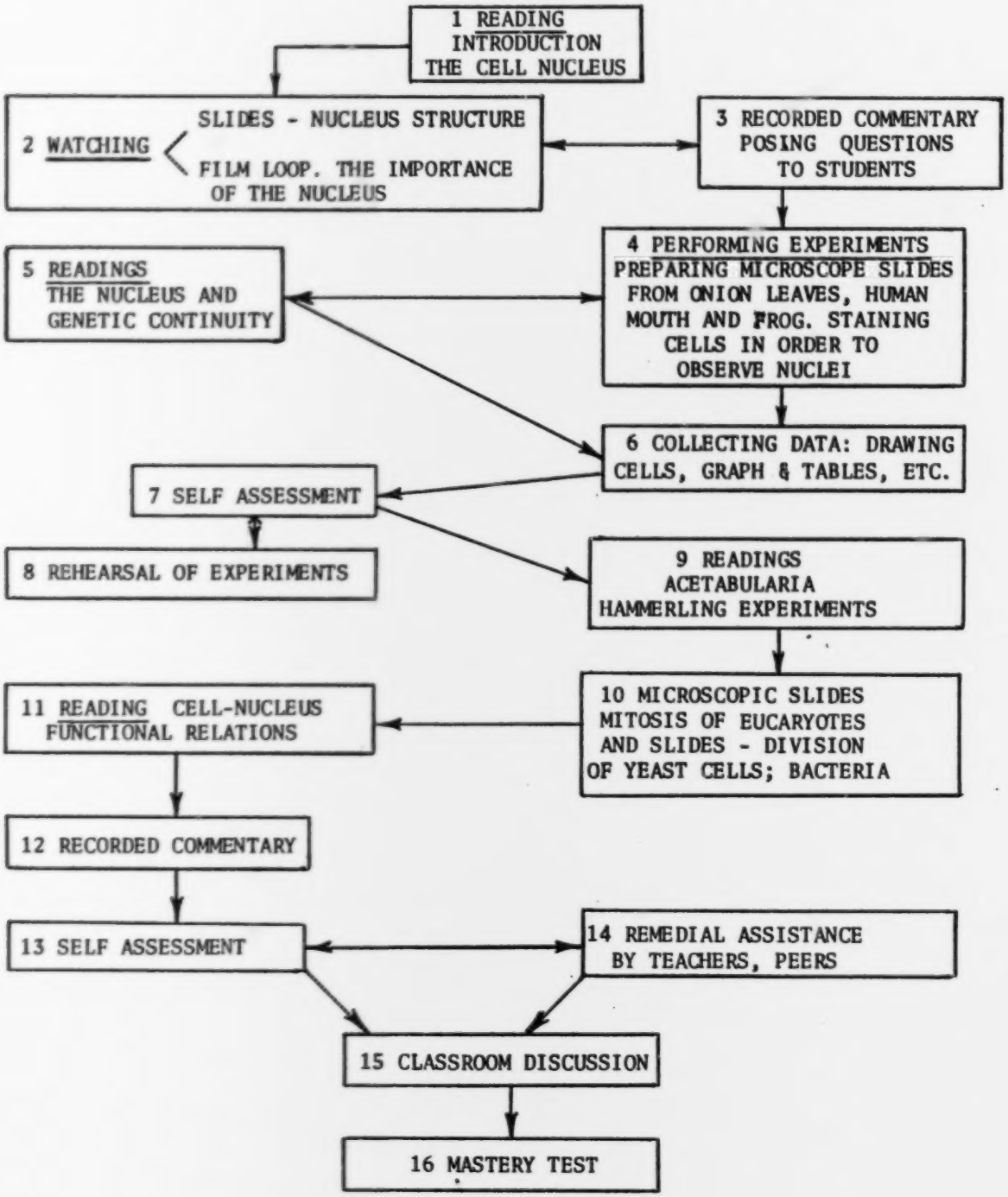

FIGURE 2

STUDENT'S RECORDING CARD

NAME:

CELL MEMBRANE UNIT

Activities 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 ext. ext. test.

CELL NUCLEUS UNIT

Activities 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
16 17 18 19 20 21 22 23 24 25 26 27 28 ext. ext. test

CELL ORGANELLES UNIT

Activities 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
ext. ext. test.

To the student:

Mark (-) if the activity is in progress
Mark (+) if the activity was completed.

ext. = extension unit

FIGURE 3

THE LEARNING PROCESS OF AN IAT IN A TYPICAL CLASSROOM

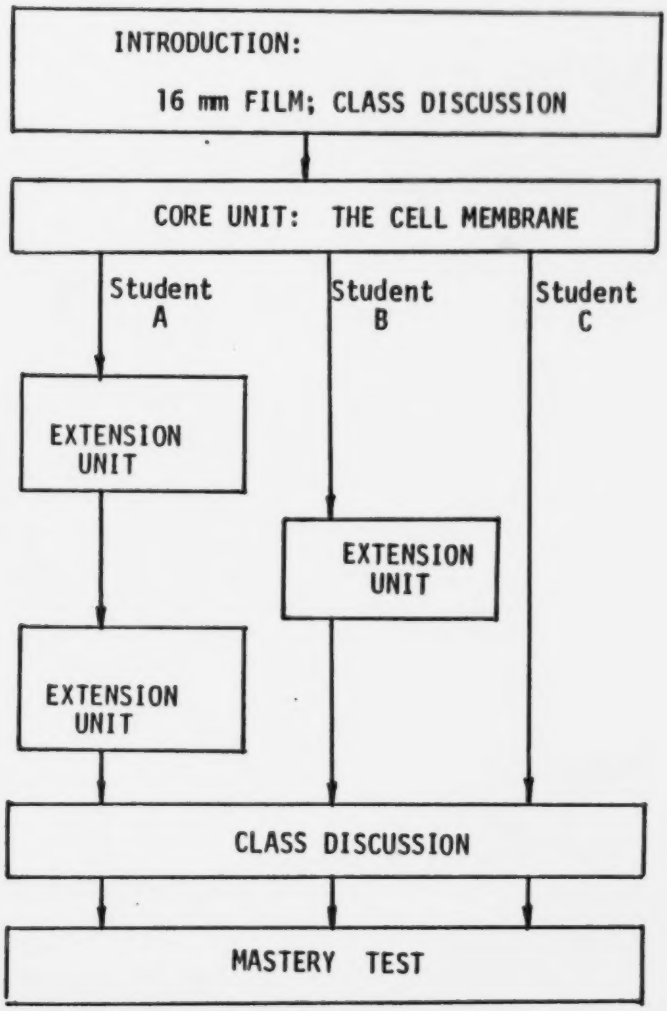

FIGURE 4

TEACHERS' AND STUDENTS' BEHAVIOUR

	CONVENTIONAL COURSES	I.A.T.P. COURSES
TEACHERS' ROLE	DISSEMINATOR OF INFORMATION	PROMOTER RESOURCE PERSON
STUDENTS' ROLE	USUALLY PASSIVE	PROVIDES FOR ACTIVE STUDENT PARTICIPATION
RATE OF LEARNING	BEGIN AND FINISH SIMULTANEOUSLY	PROCEED AT HIS OWN RATE
INDIVIDUALIZATION	GROUP ORIENTED	HIGHLY INDIVIDUALIZED
LEARNING STRATEGIES, MEDIA	FEW	VARIETY INCLD. A-V